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ATTORNEY DOCKET NO. 10004016-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): Joel P. Dunsmore et al.

Serial No.: 10/027,751 **Examiner:** Aditya S. Bhat

Filing Date: December 21, 2001 **Group Art Unit:** 2863

Title: Test System Dynamic Range Extension Through Compression Compensation

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith in ***triplicate*** is the Appeal Brief in this application with respect to the Notice of Appeal filed on April 2, 2004.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) **$330.00.**

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)(1)-(5)) for the total number of months checked below:

- ☐ one month $ 110.00
- ☐ two months $ 420.00
- ☐ three months $ 950.00
- ☐ four months $1480.00

☐ The extension fee has already been filled in this application.

☒ (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account **50-1078** the sum of $330.00. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account **50-1078** pursuant to 37 CFR 1.25.

A duplicate copy of this transmittal letter is enclosed.

Respectfully submitted,
Joel P. Dunsmore et al.

By [signature]
J. Michael Johnson
Attorney/Agent for Applicant(s)

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Date: May 28, 2004

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☒ I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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PATENT APPLICATION
ATTORNEY DOCKET NO. 10004016-1

APPEAL BRIEF dated May 28, 2004

OFFICIAL

Confirmation No. 3808

Appl. No.	:	10/027,751
Applicant	:	Joel P. Dunsmore et al.
Filed	:	Dec. 21, 2001
TC/A.U.	:	2800/2863
Examiner	:	Aditya S. Bhat
Docket No.	:	10004016-1
Customer No.	:	022878
Title	:	TEST SYSTEM DYNAMIC RANGE EXTENSION THROUGH COMPRESSION COMPENSATION

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Alexandria, VA 22313-1450

APPELLANT'S BRIEF ON APPEAL

Sir:

This is an appeal under 37 CFR 1.191 from a Final Rejection in an Office Action mailed Dec. 4, 2003 and a corresponding Advisory Action mailed Mar. 11, 2004. A Notice of Appeal was filed on Apr. 2, 2004 with a 1 mo. extension of time request. Jurisdiction over this appeal resides in the Board of Patent Appeals and Interferences under 35 U.S.C. §134. An oral hearing was not requested.

An **Appendix to Appeal Brief** follows beginning on page 28 of this paper.

A Certificate of Mailing or Transmission is provided on the last page of this document and applies to this document and any Appendix attached hereto.

REAL PARTY IN INTEREST

The real party in interest is Agilent Technologies, Inc., of Palo Alto, CA.

RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

STATUS OF THE CLAIMS

Claims 1-32 are pending. The claims for consideration on appeal in the present application are Claims 1-5, 14-19 and 21-32. Claims 6-13 and 20 are objected to as being dependent upon a rejected base claims, but are deemed allowable if rewritten in independent form. The claims are presented herewith in the attached Appendix to Appeal Brief.

STATUS OF THE AMENDMENTS

To date, no amendment has been made to the specification, drawings, or to any claim.

SUMMARY OF THE INVENTION

According to various embodiments of the present invention, a method of extending a dynamic range of a test system and a test system with extended dynamic range are provided. The various embodiments of the present invention extend the dynamic range by compensating for the effects of receiver channel compression of the test system (Page 8, lines 9 – 10). The channel compression compensation facilitates measurements, especially vector measurements of a device under test (DUT) or signal under test (SUT). In particular, the compensation applies to compression effects in both a magnitude response and a phase response of the test system (Page 8, line 15, to Page 11, line 14). Furthermore, some embodiments of the present invention are applicable to test systems having one or more receiver channels that experience a dynamic range limitation due to receiver channel compression. In particular, the embodiments of the present invention are applicable to test systems, such as vector

network analyzers and vector spectrum analyzers, that measure magnitude and phase or equivalent data for a DUT (Page 8, lines 12 – 14, Page 23, lines 20 – 25).

A method of extending dynamic range of a test system, according to some embodiments, (Page 11, lines 15 – 16, Figure 1, ref. no. 100) comprises characterizing magnitude and phase compression responses of a first or reference channel of the test system (Page 11, lines 21 – 23, Figures 1 and 2, ref. no. 110). Characterizing the first channel comprises applying an input signal having a plurality of power levels to an input of the first channel and to an input of a second channel of the test system (Page 11, lines 29 – 31, Figure 2, ref. no. 112). Each power level of the plurality is different and chosen such that the first channel is driven into compression for at least one of the power levels while the second channel is not driven into compression for any of the power levels (Page 11, line 31, to Page 12, line 1). Characterizing the first channel further comprises measuring a magnitude or amplitude compression response and a phase compression response of the first channel (Page 12, lines 10 – 11, Figure 2, ref. no. 114). The phase response is measured relative to the second channel (Page 12, line 12). Characterizing the first channel further comprises determining a magnitude compensation and a phase compensation of the first channel as a function of the plurality of power levels (Page 13, lines 4 – 6, Figure 2, ref. no. 116).

The method of extending dynamic range further comprises characterizing magnitude and phase compression responses of the second channel (Page 13, lines 25 – 27, Figures 1 and 3, ref. no. 120, 120'). In some embodiments, characterizing the second channel comprises applying another input signal having another plurality of power levels to the input of the first channel and to the input of the second channel of the test system (Page 14, lines 1 – 7, Figure 3, ref. no. 122, 122'). Each power level of the other plurality is different and the other plurality is chosen such that the second channel is driven into compression for at least one of the power levels. Characterizing the second channel further comprises measuring a magnitude or amplitude compression response and a phase compression response of the second channel (Page 14, lines 16 – 17, Figure 3, ref. no. 124, 124'). The phase compression response is measured relative to the first channel. Characterizing the second channel further comprises determining a magnitude compensation and a phase compensation

of the second channel as a function of the plurality of power levels (Page 15, lines 21 – 23, Figure 3, ref. no. 126).

The method of extending dynamic range further comprises compensating measured magnitude and phase data to correct for the effect of the compression on the data (Page 16, lines 1 – 4, Figure 1, ref. no. 130). In some embodiments, the measured data is of a device under test (DUT) and in other embodiments, the measured data is of a signal under test (SUT) (Page 11, lines 18 – 20). The compensation is for the effects of compression of one or more of the first channel and the second channel of the test system that may have occurred during a measurement of the DUT or SUT (Page 16, lines 2 – 4). Compensating comprises applying the magnitude and phase compensations that were determined for the first channel and the second channel to the measured data (Page 15, lines 4 – 9).

Characterizing the first channel and the second channel are collectively referred to as 'calibration' steps while compensating is referred to as a measurement step (Page 16, lines 10 – 12). Calibration steps need only be performed periodically, while the measurement step may be applied to every measurement (Page 16, lines 12 – 14). Moreover, the method of the present invention can be extended to any number of channels by sequentially repeating the characterizations of the first channel and of the second channel for different pairs of channels (Page 16, lines 14 – 16). The method of the present invention may be used to compensate for compression effects over a range of frequencies by repeating characterizations of the first channel and of the second channel at a plurality of frequencies within the range of frequencies (Page 16, lines 16 – 21).

A test system having extended dynamic range, according to some embodiments, (Page 24, lines 21 – 22, Figure 6, ref. no. 300) comprises a receiver channel, a controller, and a computer program stored in memory (Page 24, line 30, to Page 25, line 1, Figure 6, ref. nos. 302, 304, 306, and 320). The controller executes the computer program (Page 25, lines 5 – 7). A signal received by the receiver channel has a plurality of power levels. The power levels of the plurality are chosen so that at least one level, when applied to an input of the channel, will cause the channel to compress. The receiver channel receives and measures magnitude and phase of the signal (Page 26, lines 4 – 5). The controller processes data generated by the receiver

channel (Page 26, lines 5 – 8). In particular, the controller, through the execution of the computer program, compensates the data from the receiver channel for compression effects of the channel. Preferably, the computer program implements the method of the present invention (Page 24, lines 22 – 23, Page 26, lines 28 – 29).

In some embodiments of the test system, a limiter or equivalent non-linear device is inserted at the input of the receiver channel (Page 26, lines 9 – 10, Figure 7, ref. no. 300', 330, Page 27, lines 6 – 7, Figure 9, ref. nos. 300', 330). The limiter protects the receiver channel and helps to insure a relatively well-behaved compression characteristic of a combination of the receiver and the limiter (Page 26, lines 15 – 22). The compensation applied to measured data for the receiver channel includes compression effects of the limiter (Page 26, lines 22 – 25). The test system may be a network analyzer or a spectrum analyzer, for example. In the form of a vector network analyzer, the test system has more than one receiver channel (Page 26, lines 26 – 28, Figure 8, ref. nos. 300, 310).

By allowing the receiver or receiver plus limiter to be driven far into compression, the high end of the receiver dynamic range of the test system is increased. This effectively increases overall dynamic range without a loss of sensitivity and accuracy of the test system. Moreover, various embodiments of the present invention do not require a change to the receiver hardware or architecture, but includes a 'calibration' step and mathematical or software manipulation of the data.

ISSUES

Issue 1: Whether the Examiner's final rejection of Claims 1-5, 14-19, and 21-32 under 35 U.S.C. §102(e) as being anticipated by Kapetanic et al. (US Pat. No. 6,529,844) should be reversed on the grounds that the Examiner failed to establish a case for *prima facie* anticipation.

GROUPING OF CLAIMS

For each ground of rejection which Appellants contests hereinbelow for which the rejection ground applies to more than one claim, the additional claims do not stand or fall together to the extent the claims are separately identified and argued below. Specifically, Appellants submit that Claims 1-5, 14-19, and 21-32 do not stand or fall

together as to the rejection under 35 U.S.C. §102(e). Separately patentable as to the respective rejections under 35 U.S.C. §102(e) is explained in more detail herein below for particular claims and/or groups of claims.

ARGUMENT

Prior to beginning a discussion of and remarks regarding the above-presented issues, Appellant notes that in the Advisory Action, the Examiner stated that "[d]uring patent examination, the pending claims must be 'given the broadest reasonable interpretation consistent with the specification' " and contended, "[t]he receiver DUT [device under test] could be interpreted as the receiver channel which is compensated for as claimed in the first claim". The Examiner further suggested, "[i]f applicant were to amend the claim to further clarify the subject matter then the application maybe [*sic*] in condition for allowance". Prior to the Advisory Action, the Examiner never raised the issue that one skilled in the art may erroneously interpret a claim drawn to compensating a receiver channel of a test system as applying to compensating a receiver DUT or that an amendment clarifying the subject matter of the claim may place the claim in condition for allowance. As such, Appellant has not had an opportunity to address this issue with the Examiner. However, Appellant considers the issue moot given the discussion of the Issue 1, as addressed hereinbelow.

Issue 1: Whether the Examiner's final rejection of Claims 1-5, 14-19, and 21-32 under 35 U.S.C. §102(e) as being anticipated by Kapetanic et al. (US Pat. No. 6,529,844) should be reversed on the grounds that the Examiner failed to establish a case for *prima facie* anticipation.

Appellant submits that the Examiner, in finally rejecting Claims 1-5, 14-19, and 21-32 under 35 U.S.C. §102(e), as being anticipated by Kapetanic et al., US Pat. No. 6,529,844, (hereinafter 'Kapetanic et al.'), has erred for failing to establish a case for *prima facie* anticipation of each of the claims.

In particular, the Examiner failed to show that there is "no difference between the claimed invention and the reference disclosure, as viewed by a person of ordinary skill in the field of the invention". *Scripts Clinic & Research Found. V. Genentech Inc.*, 927 F.2d 1565, 18 USPQ 2d 1001, 1010 (Fed. Cir. 1991). Moreover, the

Examiner has not demonstrated that there is a disclosure in a single prior art reference of "each element of the claim under consideration" (*W.L. Gore & Associates v. Garlock*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983)), and has failed to show that each element disclosed by the reference is "arranged as in the claim", as required by the court (*Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.,* 730 F.2d 1452, 221 USPQ 481, 485 (Fed. Cir. 1984)).

In general, Kapetanic et al. teach a vector network measurement system including a vector network analyzer (VNA) having "three test ports and an integration of hardware and software to make an integrated set of measurements for two and three port devices" (Abstract, lines 1-4, Kapetanic et al.). Among the measurements and functions provided by the system of Kapetanic et al. are measurements of "s-parameters, third order intercept, harmonics, group delay, and noise figure" on "three port devices, such as a mixer" and "calibration of the VNA" (Col. 1, lines 16 – 20, Kapetanic et al.).

With regard to base Claim 1, the Examiner contended that Kapetanic et al. teach "a method of extending dynamic range of a test, system [*sic*] that has a receiver channel comprising: compensating for an effect that compression of the receiver channel has on as [*sic*] magnitude response and a phase response of the receiver channel, which is essentially a restatement of Appellant's Claim 1. The Examiner referred to Col. 8, lines 1 – 7 of Kapetanic et al. to support the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 1. In particular, at Col. 8, lines 1-7, Kapetanic et al. actually disclose, "[t]he phase flips are required to compensate for a phase inversion in the mixing process when the LO is higher than the RF relative to when the LO is lower than the RF. An additional $+k\pi$ term is required in the first parenthetical when the DUT is a mixer. Since phase range is limited to 2π radian span, the maximum group delay that can be measured is $1/f_m$". In this passage, which actually starts in Column 7, Kapetanic et al. are discussing a frequency translation group delay measurement and more specifically, are describing a calculation of "group delay relative to a calibration … where the phase measurement is actually a phase difference measurement due to the presence of two out-of-phase sidebands in the modulated spectrum" (Col. 7, lines 61 – 64). The

"phase flips" required to "compensate for phase inversion in the mixing process" are merely a means of mathematically accounting for high-side versus low-side mixing and are associated with the modulo 2π radian ambiguity inherent in any phase measurement (see equation and equation parameters at Col. 7, lines 65-67).

Kapetanic et al. **do not** disclose or suggest "extending dynamic range of a test system that has a receiver channel" and specifically **do not** disclose "compensating for an effect that compression of the receiver channel has on a magnitude response and a phase response of the receiver channel", as recited in Claim 1. More to the point, the 'compensation' disclosed by Kapetanic et al. in the above-referenced passage, relied on by the Examiner, has absolutely nothing to do with compression of the receiver channel or compensating for an effect such compression has on a response, either magnitude or phase, of the channel. In fact, but for the mention of the terms 'phase' and 'compensate', there is absolutely no correspondence between the above-referenced passage of Kapetanic et al., relied on by the Examiner, and that recited in Appellant's Claim 1. Moreover, even when considering the disclosure of Kapetanic et al. as a whole, one skilled in the art cannot conclude that Kapetanic et al. teach or suggest that claimed by Appellant's in base Claim 1. As such, neither at Col. 8, lines 1 – 7 nor anywhere else therein do Kapetanic et al. teach that which is recited in Appellant's base Claim 1, contrary to that contended by the Examiner.

In effect, Kapetanic et al. do not disclose "each element of the claim under consideration" (*W.L. Gore & Associates v. Garlock*, cited *supra*) "arranged as in the claim" as required by the court (*Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, cited *supra*) for a finding of *prima facie* anticipation. Contending otherwise simply is not supported by facts in evidence. As such, the Examiner failed to establish that there is "no difference between the claimed invention and the reference disclosure as viewed by a person of ordinary skill in the field of the invention" (*Scripts Clinic & Research Found. V. Genentech Inc.*, cited *supra*) and therefore, erred in finally rejecting Appellant's base Claim 1 for lack of support for a case of *prima facie* anticipation with respect to Kapetanic et al.

With regard to base Claim 16, the Examiner contended that Kapetanic et al. teach "a method of extending dynamic range of a test system comprising: characterizing a reference receiver channel of the test system for a reference

magnitude compression response and a reference phase compression response;" "characterizing a second receiver channel of the test system for a second magnitude compression response and a second phase compression response:" [*sic*]; and "compensating for an effect that compression of one or both of the reference channel and the second channel has on measured magnitude data and measured phase data", which is essentially a restatement of Appellant's base Claim 16. The Examiner relied on Figure 2 and Col. 2, lines 15 – 19 of Kapetanic et al. to support the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 16. In particular, in Figure 2, Kapetanic et al. illustrate a VNA having a noise source that may be connected to a DUT to enable a noise figure measurement on the DUT by the VNA. Kapetanic et al. disclose that "the noise source is connectable by a switch through a reflectometer A to the measurement port A of the VNA" such that the switch A can be used to enable both standard VNA measurements and noise figure measurements using port A (Col. 1, lines 57 – 63, Kapetanic et al.). At Col. 2, lines 15 – 19 (relied upon by the Examiner), Kapetanic et al. disclose, "[w]ith the receiver measuring power, and not operating in ratioed mode, the user cannot usually apply vector corrections using the VNA to compensate for DUT or system mismatches when the noise figure measurements are made". In this passage relied upon by the Examiner, Kapetanic et al. are discussing perceived shortcomings of prior art to their invention. Namely, that the switching arrangement for using the noise source precludes operating the VNA in the ratioed mode, a mode necessary for applying vector corrections associated with a VNA calibration. The 'vector corrections' referred to by Kapetanic et al. are those well-known in the art for removing or mitigating systematic errors, such as port mismatch from measurements made by the VNA, as is evidenced by further discussion by Kapetanic et al. (e.g., see Col. 2, lines 26 – 43).

Kapetanic et al. **do not** disclose or suggest "extending dynamic range of a test system" and specifically **do not** disclose "characterizing a reference receiver channel of the test system ... characterizing a second receiver channel ... and compensating for an effect that compression of one or both of the reference channel and the second channel has on measured magnitude data and measured phase data", as recited in Claim 16. More to the point, the 'compensation' disclosed by Kapetanic et al. in the

above-referenced passage has nothing to do with compression of the receiver channel or compensating for an effect such compression has on a response, either magnitude or phase, of the channel. Instead, in disclosing, "to compensate for DUT or system mismatches", Kapetanic et al. are clearly referring to conventional VNA calibration operations. In addition, there is no mention or even an inference to characterizing one or both of a reference receiver channel and a second receiver channel or applying the compensation to measured magnitude data and phase data.

In fact, but for the use of the terms 'compensate', 'receiver' and 'measurements', there is absolutely no correspondence between the above-mentioned passage of Kapetanic et al. and that recited in Appellant's Claim 16. Even when considering the disclosure of Kapetanic et al. as a whole, one skilled in the art cannot conclude that Kapetanic et al. teach or suggest that claimed by Appellant's in base Claim 16. As such, neither in Figure 2, at Col. 2, lines 15 – 19, nor anywhere else therein for that matter, do Kapetanic et al. teach that recited in Appellant's base Claim 16, contrary to that contended by the Examiner.

Again, Kapetanic et al. simply do not disclose "each element of the claim under consideration" (*W.L. Gore & Associates v. Garlock*, cited *supra*) "arranged as in the claim" as required by the court (*Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, cited *supra*) for a finding of *prima facie* anticipation. Contending otherwise is not supported by facts in evidence. As such, the Examiner failed to establish that there is "no difference between the claimed invention and the reference disclosure as viewed by a person of ordinary skill in the field of the invention" (*Scripts Clinic & Research Found. V. Genentech Inc.*, cited *supra*) and therefore, erred in finally rejecting Appellant's base Claim 16 for lack of support for a case of *prima facie* anticipation.

With regard to base Claim 27, the Examiner contended that Kapetanic et al. teach a "test system having extended dynamic range comprising: a receiver channel"; "a controller that processes magnitude data and phase data generated by the receiver channel"; and "a computer program stored in memory, the computer program being executed by the controller, the computer program implementing instructions that compensate for an effect on the generated data caused by the receiver channel being compressed", which is essentially a restatement of Appellant's base Claim 27. The

Examiner relied upon Figure 2 with respect to the reference channel, Figure 3 and reference number 764 of Figure 7 with respect to the controller, and Col. 2, lines 50 – 55, with respect to the "computer program implementing instructions that compensate for an effect ... ", to support the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 27. In particular, as discussed hereinabove, in Figure 2, Kapetanic et al. illustrate a VNA having a noise source that may be connected to a DUT to enable a noise figure measurement on the DUT by the VNA. Figure 3 of Kapetanic et al. illustrates an automatic calibration device for using in automatically calibrating the VNA (see for example, Col. 2, lines 44 – 61). Reference number 764, illustrated in Figure 7, is described by Kapetanic et al. as a processor that, along with a DSP –IF processor, implements a process "to provide for measurements of harmonics from a DUT with calculations to improve measurement accuracy to eliminate the effects of harmonics from one of the signal sources 708 or 710 on the measurements" (see Col. 9, lines 40 – 44). Specifically, Kapetanic et al. seek to remove spurious harmonics caused by the signal source(s) from harmonic measurements performed on the DUT. At Col. 2, lines 50 – 55, relied upon by the Examiner, Kapetanic et al. disclose, "[t]he controller is programmed to function as the user, and sends information to the VNA's processor to set up and run each calibration step after each calibration component is connected by internal switches in the automatic calibration device to the terminals of the VNA".

Kapetanic et al. do not disclose or suggest generally a "test system having extended dynamic range" and do not disclose specifically "a receiver channel; a controller that processes ...; and a computer program ... implementing instructions that compensate for an effect on the generated data caused by the receiver channel being compressed", as recited in base Claim 27. More to the point, the process of removing source-related harmonics disclosed by Kapetanic et al. with respect to Figure 7, reference number 764 has nothing to do with receiver channel compression or compensating for an effect thereof on generated data. Moreover, the passage at Col. 2, lines 50 – 55 (relied on by the Examiner), similarly has nothing to do with that claimed by Appellant in base Claim 27. Instead, in disclosing, "[t]he controller is programmed ... of the VNA", Kapetanic et al. are merely relating that the VNA can

provide automated calibration using the automatic calibration device without requiring input or direction from the user. In addition, there is no mention or even an inference to compression or dynamic range of the test system in the aforementioned passages and figures of Kapetanic et al.

In fact, but for the use of the terms 'controller', 'processor' and 'programmed', which can reasonably be construed as indicating a computer program implementing some task, there is absolutely no correspondence between the above-mentioned passages and figures of Kapetanic et al. and that recited in Appellant's Claim 27. For that matter, Kapetanic et al. is not even disclosing implementing 'compensating' with a computer program, but instead is describing implementing automated calibration of the VNA by programming same. Even when considering the disclosure of Kapetanic et al. as a whole, one skilled in the art cannot conclude that Kapetanic et al. teach or suggest that claimed by Appellant's in base Claim 27. As such, neither in Figure 2, Figure 3, reference number 764 of Figure 7, and at Col. 2, lines 50 – 55 nor anywhere else therein for that matter, do Kapetanic et al. teach that recited in Appellant's base Claim 27, contrary to that contended by the Examiner.

In effect, Kapetanic et al. simply do not disclose "each element of the claim under consideration" (*W.L. Gore & Associates v. Garlock*, cited *supra*) "arranged as in the claim", as required by the court (*Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, cited *supra*) for a finding of *prima facie* anticipation. Contending otherwise is not supported by facts in evidence. As such, the Examiner failed to establish that there is "no difference between the claimed invention and the reference disclosure as viewed by a person of ordinary skill in the field of the invention" (*Scripts Clinic & Research Found. V. Genentech Inc.*, cited *supra*) and therefore, erred in finally rejecting Appellant's base Claim 27 for lack of support for a case of *prima facie* anticipation.

With regard to Claim 2, the Examiner contended that Kapetanic et al. teach "compensating comprises correcting data measured for one of a device under test and a signal under test using the test system", which is essentially a restatement of Appellant's Claim 2. The Examiner cited Col. 2, lines 17-20 of Kapetanic et al. to support the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 2. The disclosure at Col. 2, lines 17-20 of Kapetanic et al. has been discussed already hereinabove with respect to the rejection of base Claim 16 (i.e., Col. 2, lines 15 -19, Kapetanic et al.). While mentioning the terms "corrections" and "to compensate", this passage of Kapetanic et al. has nothing to do with that recited in Appellant's Claim 2. In particular, Kapetanic et al. are disclosing an inability to apply vector corrections to compensate for DUT or system mismatches and are not disclosing "correcting data measured for one of a device under test and a signal under test using the test system", as recited in Claim 2.

With regard to Claim 3, the Examiner contended that Kapetanic et al. teach "the test system is one of a network analyzer and a spectrum analyzer". The Examiner cited Col. 3, lines 10 – 15 of Kapetanic et al. to support the contention.

At Col. 3, lines 10 – 15, Kapetanic et al. actually disclose, "[t]he spectrum analyzer is used to measure the mixer output since the reflectometers of a VNA are typically configured to measure scattering parameters rather than to provide the function of a spectrum analyzer. Using the VNA to provide the input to one port of the mixer will allow use of the VNA to characterize one port of the mixer will allow the use of the VNA to characterize one port of the mixer without reconfiguration of the mixer test setup".

While Kapetanic et al. disclose both a spectrum analyzer and a VNA, they do not disclose "the test system is **one** of a network analyzer and a spectrum analyzer", as recited in Appellant's Claim 3 (**emphasis** added). Instead, according to Kapetanic et al., the test system is **both** of a network analyzer and a spectrum analyzer. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 3, contrary to the Examiner's contention.

With regard to Claim 4, the Examiner contended that Kapetanic et al. teach "compensating comprises: characterizing a first receiver channel of the test system for a first magnitude compression response and a first phase compression response; characterizing a second receiver channel of the test system for a second magnitude compression response and a second phase compression response"; and "compensating magnitude and phase data for the compression responses of each of the channels, the magnitude and phase data being measured by the first channel and the second

channel.". The Examiner cited Col. 1, lines 24 – 27, with respect to characterizing the first and second receiver channels, and Col 2, lines 17 – 20, with respect to compensating, to support the contention.

With respect to Col. 1, lines 24 – 27, relied upon by the Examiner, Kapetanic et al. disclose, "[t]he VNA is configured to make vector measurements, including both magnitude and phase, of a device under test (DUT) connected across its two test ports A and B". This disclosure of Kapetanic et al. is merely a recitation of what a conventional VNA is and/or what functions it provides (see lines 23-24 of Col. 1, for example). That is, a VNA makes vector (i.e., magnitude and phase) measurements of a DUT. With respect to Col. 2, lines 17 – 20, such disclosure by Kapetanic et al. has been discussed already hereinabove, with respect to the rejection of base Claim 16 and further, with respect to the rejection of Claim 2 (i.e., Col. 2, lines 15 -19, Kapetanic et al.).

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 4. In particular, Kapetanic et al. do not disclose "characterizing a first receiver channel of the test system for a first magnitude compression response and a first phase compression response" or "characterizing a second receiver channel of the test system for a second magnitude compression response and a second phase compression response", as recited in Appellant's Claim 4. There is no mention of a **compression response** or **characterizing** receiver channels therefor anywhere in that disclosed by Kapetanic et al. More to the point, Kapetanic et al. do not disclose performing measurements of any kind on the receiver channels, except perhaps indirectly, for calibration purposes. For example, the magnitude and phase measurements disclosed by Kapetanic et al. at Col. 1, lines 24 – 27, relied upon by the Examiner, are not magnitude and phase measurements of the **receiver channels** but instead, are magnitude and phase measurements of the **DUT**. As for Col. 2, lines 17 – 20 of Kapetanic et al., which was relied upon by the Examiner for "compensating ... for the compression responses ...", there is a lack of correspondence between that disclosed in Col. 2, lines 17 – 20 and that recited in Claim 4, which has been addressed already hereinabove with respect to the rejection of base Claim 16. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 4, contrary to the Examiner's contention.

With regard to Claim 5, the Examiner contended that Kapetanic et al. teach "characterizing the first receiver channel, characterizing the second receiver channel, and compensating data is [*sic*] performed sequentially at one or more of a plurality of different frequencies within a range of frequencies", which is essentially a restatement of Appellant's Claim 5. In support of the rejection of Claim 5, the Examiner again cited Col. 2, lines 17 - 20 of Kapetanic et al.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 5. That which Kapetanic et al., actually disclose at Col. 2, lines 17-20, has been discussed already hereinabove with respect to the rejection of base Claim 16 (i.e., Col. 2, lines 15 -19, Kapetanic et al.). As stated previously herein, while mentioning "corrections" and "to compensate", this passage of Kapetanic et al. has nothing to do with characterizing receiver channels or compensating data being performed sequentially. Instead, Kapetanic et al. are disclosing an inability to apply vector corrections to compensate for DUT or system mismatches. In fact, neither in the passage referred to by the Examiner nor anywhere else therein do Kapetanic et al. disclose or suggest that recited in Claim 5, contrary to the Examiner's contention.

With regard to Claim 14, the Examiner contended that Kapetanic et al. teach "characterizing the first receiver channel and characterizing the second receiver channel each comprises: driving the receiver channel into compression, such that the channel has non-linear behavior; and determining a deviation from linear behavior of the compressed receiver channel", which is essentially a restatement of Appellant's Claim 14. In support of the rejection of Claim 14, the Examiner cited Col. 3, lines 17 – 30 of Kapetanic et al.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 14. Instead, at Col. 3, lines 17 – 30 (relied upon by the Examiner), Kapetanic et al. disclose, "[a] typical test set up for measurement of second or third order intercept" shown in Figure 5, and further state, "[s]econd and third order intercept measurements are a way of characterizing distortion". Kapetanic et al. further note, "[b]ecause of the increasing need for wide dynamic range at high frequencies, most wideband amplifiers, as well as other microwave and millimeter wave components, now have distortion

specification" and go on to describe intermodulation distortion (IMD) and the measurement thereof. Kapetanic et al. are clearly describing measuring second and third order intercepts for a DUT. Figure 5 of Kapetanic et al. clearly illustrates a relationship between DUT and the typical test set being described. In particular, the 'DUT' is illustrated connected between an output of a 'combiner' and an input of a 'spectrum analyzer'. A 'VNA' and a 'signal generator' are illustrated connected to inputs of the 'combiner'. As such, Kapetanic et al. are distinguishing between the DUT (i.e., wideband amplifiers and other microwave or millimeter wave components) and the test set up, including a VNA and a spectrum analyzer.

In contrast, according to Appellant's Claim 14, the "the first receiver channel" and "the second receiver channel" being characterized are "of the test system" (also see Claim 4, from which Claim 14 is dependent). As such, the DUT disclosed by Kapetanic et al. cannot be either "the first receiver channel" or "the second receiver channel", as recited in Claim 14.

Moreover, Kapetanic et al. do not teach "driving the receiver channel into compression ...", as recited in Claim 14. Instead, Kapetanic et al. disclose applying "two spectrally pure signals" to the DUT, measuring and plotting "[t]he output signal power in a single signal (in dBm) and the relative amplitudes of the second-order and third order products referenced to the single signal", and extrapolating the measurements to a "projected intersections ... called the second and third order intercept points" (Col. 3, lines 31 – 44; also see Figure 6, Kapetanic et al.). As such, Kapetanic et al. are disclosing a conventional test for second and third order intercept points that typically avoids driving the DUT into compression to avoid damaging the DUT. Thus, Kapetanic et al. do not disclose that recited in Appellant's Claim 14, contrary to the Examiner's contention.

With regard to Claim 15, the Examiner contended that Kapetanic et al. teach "wherein driving and determining are repeated at a plurality of different frequencies", which is essentially a restatement of Appellant's Claim 15. In support of the rejection of Claim 15, the Examiner cited Col. 3, lines 20 – 21 of Kapetanic et al.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 15. Instead, at Col. 3, lines 20 – 21, Kapetanic et al. disclose, "[b]ecause of the increasing need for wide

dynamic range at high frequencies, most wideband amplifiers, ... now have distortion specification". While Kapetanic et al. do disclose the terms "high frequencies" and "wideband", the disclosure of these terms in the context of Col. 3, lines 20-21 or anywhere else therein has nothing to do with that recited in Appellant's Claim 15. Kapetanic et al. do not disclose or even suggest "wherein driving [the receiver channel ...] and determining [a deviation ...] are repeated at a plurality of different frequencies", as recited in Claim 15. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 15, contrary to the Examiner's contention.

With regard to Claim 17, the Examiner contended that Kapetanic et al. teach "the reference channel is characterized comprising: applying an input signal to an input of the reference channel and to an input of the second channel, the input signal having a plurality of different power levels, wherein at least one of the power levels drives the reference channel into compression, while the second channel is non-compressed"; "measuring the reference magnitude compression response and the reference phase compression response of the reference channel, the phase compression response being measured relative to the second channel"; and "determining a magnitude compensation and a phase compensation for the reference channel as a function of the plurality of power levels of the input signal", which is essentially a restatement of Appellant's Claim 17. The Examiner referred to Figure 7 of Kapetanic et al. with respect to "applying an input signal ... while the second channel is non-compressed", referred to Col. 1, lines 25 – 26, with respect to "measuring ...", and further to Col. 1, lines 52 – 56, with respect to "determining ...", in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 17. Instead, in Figure 7, Kapetanic et al. illustrate a block diagram of a VNA. There is no disclosure associated with Figure 7 by Kapetanic et al. at least that the VNA provides for driving "the reference channel into compression, while the second channel is non-compressed", as recited in Appellant's Claim 17. Moreover, at Col. 1, lines 24 – 26 (relied upon by the Examiner), Kapetanic et al. disclose, "[t]he VNA is configured to make vector measurements, including both magnitude and phase, of a device under test (DUT) connected across its two test ports A and B". While in the passage relied

upon by the Examiner, Kapetanic et al. do disclose "vector measurements" including "both magnitude and phase", the measurements are explicitly stated to be of a **DUT connected across the test ports** of the VNA, and **not** of a receiver channel of the test system. As such, this particular disclosure by Kapetanic et al. can hardly be confused by one skilled in the art with "measuring the reference magnitude compression response and the reference phase compression response of the reference channel, the phase compression response being measured relative to the second channel", as recited in Appellant's Claim 17. Finally, at Col. 1, lines 52 – 56 relied upon by the Examiner, Kapetanic et al. disclose, "[t]he receiver downconverts the noise source signal from the DUT to an intermediate frequency (IF) range, and the IF signal is processed to provide an indication of power level enabling the noise figure to be determined over the frequency range". This passage of Kapetanic et al. deals with conventional noise figure measurements of a DUT and is in no way related to "determining a magnitude compensation and a phase compensation for the reference channel ...", as recited in Appellant's Claim 17. In fact, despite the presence of the terms "signal", "power level" and "determined" in Col. 1, lines 52-56, Appellant is unable to discern any plausible connection between this particular disclosure by Kapetanic et al. and that recited in Appellant's Claim 17. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 17, contrary to the Examiner's contention.

With regard to Claim 18, the Examiner contended that Kapetanic et al. teach that the "second channel is characterized comprising: applying another input signal" "to the input of the second channel and to the input of the reference channel, the other input signal having another plurality of power levels; wherein at least one of the power levels drives the second channel into compression"; "measuring the second magnitude compression response and the second phase compression response of the second channel, the second phase compression response being measured relative to the reference channel"; "and determining a magnitude compensation and a phase compensation for the second channel as a function of the other plurality of power levels of the other input signal", which is essentially a restatement of Appellant's Claim 18. The Examiner referred to Col. 3, lines 2 – 5, of Kapetanic et al. with respect to "applying another input signal", to Figure 7 of Kapetanic et al. with respect

to "to the input of the second channel ... into compression", to Col. 1, lines 25 – 26, of Kapetanic et al. with respect to "measuring the second magnitude ... relative to the reference channel", and to Col. 1, lines 52 – 56 of Kapetanic et al. with respect to "determining a magnitude ... input signal", in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 18. Instead, at Col. 3, lines 2 – 5, Kapetanic et al. disclose, "[a] first of two input signals f_1 is provided to the mixer from a VNA. Since the VNA only has one signal source, apart from its local oscillator, a second signal f_2 is provided from an external signal generator". While Kapetanic et al. do disclose using two signals, Kapetanic et al. disclose applying the signals to a mixer (i.e., DUT) and not to a channel of the test system. As such, the above-referenced passage does not disclose that contended by the Examiner with respect to Claim 18. Similarly, Figure 7, Col. 1, lines 25 – 26 and lines 52 – 56, of Kapetanic et al., which have been discussed above with respect to Claim 17, disclose measurements for a DUT and not of the test system channels. While these passages use the terms "magnitude and phase", "measurements", "receiver", and "power level", there is no justifiable correlation between what is disclosed by Kapetanic et al. therein and that recited in Appellant's Claim 18. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 18, contrary to the Examiner's contention.

With regard to Claim 19, the Examiner contended that Kapetanic et al. teach "attenuating the input signal before the input signal is applied to the second channel to achieve the second channel non-compression", which is essentially a restatement of Appellant's Claim 19. The Examiner referred to reference number 748 and Col. 6, line 25 of Kapetanic et al. in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 19. Instead, at Col. 6, line 25, Kapetanic et al. disclose "a step attenuator 748" in the context of a signal source being connected through couplers 711 and 721 and the step attenuator 748 to the test port. While a step attenuator may be employed in "attenuating the input signal", as recited in part in Claim 19, Kapetanic et al. do not disclose "attenuating the input signal before the input signal is applied to the second channel to achieve the second channel non-compression", contrary to that contended by the Examiner. As such,

Kapetanic et al. do not disclose that recited in Appellant's Claim 19, contrary to the Examiner's contention.

With regard to Claim 21, the Examiner contended that Kapetanic et al. teach "compensating comprises using magnitude compensations and phase compensations determined for the reference channel and the second channel to correct the measured data", which is essentially a restatement of Appellant's Claim 21. The Examiner referred to Col. 1, lines 23 – 27 of Kapetanic et al. in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 21. As explained above with respect to at least Claim 18, except for the disclosure of the terms "magnitude and phase" and "measurements" on lines 25-26 of Col. 1, there is no relevant correlation between what is disclosed by Kapetanic et al. at Col. 1, lines 23 – 27, and that recited in Appellant's Claim 21. In particular, Kapetanic et al. in the above-cited passage do not disclose or suggest "compensating comprises using magnitude compensations and phase compensations" but instead merely disclose "vector measurements, including both magnitude and phase". Moreover, Kapetanic et al. fail to disclose or suggest compensations being "determined for the reference channel and the second channel to correct measured data", as recited in Claim 21. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 21, contrary to the Examiner's contention.

With regard to Claim 22, the Examiner contended that Kapetanic et al. teach "the measured magnitude data and the measured phase data are measured for one of a device under test and a signal under test using the reference channel and the second channel of the test system", which is essentially a restatement of Appellant's Claim 22. In support of the contention, the Examiner again referred to Col. 1, lines 23 – 27 of Kapetanic et al.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 22. In particular, Claim 22 is directly dependent from Claim 21 and ultimately dependent from base Claim 16. Therefore, Claim 22 includes all of the limitations of Claims 16 and 21. Appellant has presented above support that Kapetanic et al. fail to disclose or even suggest all of

the elements/limitations recited in each of Claims 16 and 21. As such, Kapetanic et al. cannot disclose or suggest all of the elements/limitations recited in Claim 22.

With regard to Claim 23, the Examiner contended that Kapetanic et al. teach "characterizing the reference channel and characterizing the second channel are performed periodically, while compensating is performed for each data measurement of one of a device under test and a signal under test", which is essentially a restatement of Appellant's Claim 23. The Examiner again referred to Col. 2, lines 17 – 20, of Kapetanic et al. in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 23. As was discussed hereinabove for at least Claim 5, except for the use of terms "receiver", "measurements", and "compensate" at Col. 2, lines 17 – 20, that actually taught by Kapetanic et al. has no relevant correlation to that recited in Appellant's Claim 23. In particular, at Col. 2, lines 17 – 20, Kapetanic et al. are disclosing an **inability** to apply vector corrections to compensate for DUT or system mismatches. Kapetanic et al. do not disclose or suggest "characterizing the reference channel and characterizing the second channel ...", as recited in part in Claim 23. Moreover, Kapetanic et al. do not disclose or suggest performing channel characterizations "periodically, while compensating is performed for each data measurement", as further recited in part in Claim 23. Thus, Kapetanic et al. fail to disclose or even suggest that recited in Appellant's Claim 23.

With regard to Claim 24, the Examiner contended that Kapetanic et al. teach "the test system comprises more channels than the reference channel and the second channel, and wherein characterizing is performed sequentially for different pairs of channels in the test system", which is essentially a restatement of Appellant's Claim 24. The Examiner referred to Col. 6, lines 59 – 63, of Kapetanic et al. in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 24. At Col. 6, lines 59 – 63, Kapetanic et al. actually disclose, "[w]ith the three test ports 701-703, the LO 706, two signal sources 708 and 710, and components for connection as shown in FIG. 7 and described above, full three port error corrected measurements can be made for a

three port device". Nowhere therein, or anywhere else in Kapetanic et al., is "characterizing is performed sequentially for different pairs of channels in the test system" disclosed or even suggested. In particular, as is discussed at length hereinabove, Kapetanic et al. do not disclose "characterizing", as defined in Appellant's specification and employed in Appellant's claims including Claim 24. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 24, contrary to the Examiner's contention.

With regard to Claim 25, the Examiner contended that Kapetanic et al. teach "the test system comprises a single receiver channel, one of the reference channel and the second channel being an implicit channel", which is essentially a restatement of Appellant's Claim 25. The Examiner generally referred to Figure 2 of Kapetanic et al. in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 25. Figure 2 of Kapetanic et al. is discussed in detail hereinabove. In particular, Kapetanic et al. at least do not disclose, "the second channel being an implicit channel" in Figure 2 or anywhere else in Kapetanic et al. for that matter. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 25, contrary to the Examiner's contention.

With regard to Claim 26, the Examiner contended that Kapetanic et al. teach "characterizing the reference receiver channel, characterizing the second receiver channel, and compensating are performed sequentially at one or more frequencies", which is essentially a restatement of Appellant's Claim 26. The Examiner referred to Col. 2, lines 16 – 19 of Kapetanic et al., in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 26. The disclosure of Kapetanic et al., at Col. 2, lines 16 – 19, has been discussed already hereinabove with respect to the rejection of Claims 2, 4, 5, base Claim 16, and Claim 23. While using the terms "receiver" and "compensate", this passage of Kapetanic et al. has nothing to do with that recited in Claim 26. In particular, Kapetanic et al. are disclosing an inability to apply vector corrections to compensate for DUT or system mismatches and are not disclosing or even suggesting, "characterizing the reference receiver channel, characterizing the second receiver channel, and compensating are performed

sequentially at one or more frequencies", as recited in Claim 26. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 26, contrary to the Examiner's contention.

With regard to Claim 28, the Examiner contended that Kapetanic et al. teach "a power limner [*sic*] connected to an input of the receiver channel, wherein the instructions implemented by the computer program further compensate for an effect on the generated data caused by the limiter being compressed", which is essentially a restatement of Appellant's Claim 28. The Examiner referred to Col. 6, lines 25 – 26, and reference number 748 of Kapetanic et al., in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 28. In particular, Kapetanic et al. disclose "a step attenuator 748" at Col. 6, lines 25-26. One skilled in the art would understand that a step attenuator, which is a linear device that attenuates a signal passing therethrough by dissipating some of the power of the signal, is distinctly different and distinguished from a power limiter, which is a non-linear device that exhibits a defined compression point at a particular power level thereby limiting a maximum power level of a signal passing therethrough. Thus, the Examiner's reliance on reference no. 748 at Col. 6, lines 25-26 of Kapetanic et al. to support a contended disclosure of a "power limiter" is erroneous. Moreover, Kapetanic et al. at least do not disclose "instructions implemented by the computer program further compensate for an effect on the generated data caused by the limiter being compressed", as recited in part in Claim 28. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 28, contrary to the Examiner's contention.

With regard to Claim 29, the Examiner contended that Kapetanic et al. teach "the test system is one of network analyzer and a spectrum analyzer", which is essentially a restatement of Appellant's Claim 29. The Examiner referred to Col. 3, lines 9 – 10 of Kapetanic et al., in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 29. In particular, at Col. 3, lines 9 – 10, Kapetanic et al. disclose, "[t]he spectrum analyzer is used to measure the mixer output since the reflectometers of a VNA ...". Kapetanic et al. further disclose at lines 14-16 of Col. 3, "[u]sing the VNA to provide the input to one port of

the mixer will allow use of the VNA ...". While Kapetanic et al. disclose using both a spectrum analyzer and a VNA, they do not disclose "the test system is **one** of [a] network analyzer and a spectrum analyzer", as recited in Appellant's Claim 29 (**emphasis** added). Instead, the test system according to Kapetanic et al. is **both** of a network analyzer and a spectrum analyzer. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 29, contrary to the Examiner's contention.

With regard to Claim 30, the Examiner contended that Kapetanic et al. teach "another receiver channel;" and "a signal source;" wherein "the signal source generates a signal that is applied to the receiver channel, to an input of a device under test, and after passing through the device under test, to the other receiver channel, and wherein phase is measured as a phase difference between the receiver channels", which is essentially a restatement of Appellant's Claim 30. The Examiner referred generally to Figure 2 of Kapetanic et al. with respect to "another receiver channel, generally to Figure 1 of Kapetanic et al. with respect to "a signal source", and to Col. 1, lines 23 – 55 of Kapetanic et al. with respect to "wherein the signal source ... the receiver channels", in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 30. In particular, Claim 30 is dependent from and includes all of the limitations of base Claim 27. Appellant has presented above support that Kapetanic et al. fail to disclose or even suggest all of the elements/limitations recited in base Claim 27. As such, Kapetanic et al. cannot disclose or suggest all of the elements/limitations recited in Claim 30.

With regard to Claim 31, the Examiner contended that Kapetanic et al. teach "a power limiter connected to an input of the second receiver channel, wherein the instructions implemented by the computer program further compensate for an effect on the generated data caused by the limiter being compressed", which is essentially a restatement of Appellant's Claim 31. The Examiner referred to Col. 6, lines 25 – 26, and reference number 748 of Kapetanic et al., in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 31. In particular, reference number 748 indicates a "step attenuator 748" of Kapetanic et al. and, as discussed hereinabove with respect to the rejection of Claim 28, one skilled in the art

would not confuse a "power limiter" and a "step attenuator" or consider them to be equivalent. Thus, at Col. 6, lines 25-26, Kapetanic et al. at least do not disclose or suggest a "power limiter". Moreover, Kapetanic et al. at least do not disclose "instructions implemented by the computer program further compensate for an effect on the generated data caused by the limiter being compressed". As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 31, contrary to the Examiner's contention.

With regard to Claim 32, the Examiner contended that Kapetanic et al. teach "a computer program further implements instructions that drive the receiver channel into compression, such that the channel has non-linear behavior; and that determine a deviation from linear behavior of the compressed receiver channel, the deviation being the effect on the generated data", which is essentially a restatement of Appellant's Claim 32. The Examiner referred to Col. 2, lines 51 – 52 of Kapetanic et al., in support of the contention.

Contrary to that contended by the Examiner, Kapetanic et al. do not teach, explicitly or implicitly, that claimed by Appellant in Claim 32. In particular, at Col. 2, lines 51 – 52, Kapetanic et al. disclose, "[t]he controller is programmed to function as the user, and sends information to the VNA's processor to set up and run ...". As discussed hereinabove with respect to the rejection of base Claim 27, the above-cited passage of Kapetanic et al. merely relates that the VNA can provide automated calibration using an automatic calibration device without requiring input or direction from the user. The passage has no relationship to that recited in Claim 32. Specifically, Kapetanic et al. do not disclose or suggest "instructions that drive the receiver channel into compression" or instructions "that determine a deviation from linear behavior" as recited in part in Appellant's Claim 32. In addition, there is no mention of "the deviation being the effect on the generated data", also recited in part in Claim 32, in the aforementioned passage of Kapetanic et al. As such, Kapetanic et al. do not disclose that recited in Appellant's Claim 32, contrary to the Examiner's contention.

Thus, for each of Claims 2-5, 14, 15, 17-19, and 21-26, 28-32 standing alone, Kapetanic et al. simply do not disclose "each element of the claim under consideration" (*W.L. Gore & Associates v. Garlock*, cited *supra*) "arranged as in the

claim", as required by the court (*Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, cited *supra*) for a finding of *prima facie* anticipation. The Examiner has failed to establish that there is "no difference between the claimed invention and the reference disclosure as viewed by a person of ordinary skill in the field of the invention" (*Scripts Clinic & Research Found. V. Genentech Inc.*, cited *supra*).

In addition to the remarks above for each of Claims 2-5, 14, 15, 17-19, and 21-26, 28-32, standing alone, each of Claims 2-5, 14 and 15 is ultimately dependent from base Claim 1; each of Claims 17-19 and 21-26 is ultimately dependent from base Claim 16; and each of Claims 28-32 is ultimately dependent from base Claim 27. Appellant has presented sufficient remarks above to support that Kapetanic et al. fail to disclose that recited in each of Appellant's base Claims 1, 16 and 27. Therefore by definition, Kapetanic et al. also fail to disclose that recited in each of Claims 2-5, 14 and 15, each of Claims 17-19 and 21-26, and each of Claims 28-32, which depend from base Claims 1, 16 and 27, respectively.

As such, for at least the reasons discussed hereinabove, the Examiner erred in initially rejecting and subsequently maintaining a final rejection of each of Appellant's dependent Claim 2-5, 14, 15, 17-19, and 21-26, 28-32, as well as each of Appellant's base Claims 1, 16 and 27, for lack of support for a case of *prima facie* anticipation.

RELIEF SOUGHT

Appellant has demonstrated that the Examiner failed to establish *prima facie* anticipation of any of Claims 1-5, 14-19, and 21-32 under 35 U.S.C. §102(e). As such, Appellant has demonstrated that Claims 1-5, 14-19, and 21-32 are separately patentable, as provided above. Furthermore, Claims 6-13 and 20 that were objected to as being dependent upon rejected base claims, should likewise be patentable without amendment in light of the Examiner's failure to establish *prima facie* anticipation with respect to the relevant base claims. As stated by the Federal Circuit "if the examination at the initial stage does not produce a *prima facie* case of unpatentability, then without more the applicant is entitled to grant of patent". *In re Oelrich*, 977, F.2d 1443, 24 USPQ 2d 1443 (Fed. Cir. 1992). Accordingly, Appellant respectfully

requests that the Board of Patent Appeals and Interferences reverse the rejection of Claims 1-5, 14-19, and 21-32 under 35 U.S.C. §102(e), such that the objection to Claims 6-13 and 20 is rendered moot.

Respectfully submitted,
JOEL P. DUNSMORE ET AL.

By: [signature]
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Agent for Applicant(s)
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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to the Commissioner for Patents, P. O. Box 1450, Alexandria, VA 22313-1450 on the date indicated below.

[signature] 5/28/04

Signature **Date**

APPENDIX TO APPEAL BRIEF

Listing of Claims

1. A method of extending dynamic range of a test system that has a receiver channel comprising:

compensating for an effect that compression of the receiver channel has on a magnitude response and a phase response of the receiver channel.

2. The method of Claim 1, wherein compensating comprises correcting data measured for one of a device under test and a signal under test using the test system.

3. The method of Claim 1, wherein the test system is one of a network analyzer and a spectrum analyzer.

4. The method of Claim 1, wherein compensating comprises:

characterizing a first receiver channel of the test system for a first magnitude compression response and a first phase compression response;

characterizing a second receiver channel of the test system for a second magnitude compression response and a second phase compression response; and

compensating magnitude and phase data for the compression responses of each of the channels, the magnitude and phase data being measured by the first channel and the second channel.

5. The method of Claim 4, wherein characterizing the first receiver channel, characterizing the second receiver channel, and compensating data are performed

sequentially at one or more of a plurality of different frequencies within a range of frequencies.

6. The method of Claim 5, wherein the compensation is interpolated so as to correct for the effect of compression on the magnitude and phase measurement data at frequencies other than those frequencies included in the plurality of different frequencies.

7. The method of Claim 4, wherein the first channel is characterized comprising:

using an input signal to drive the first channel into compression, the input signal having a plurality of power levels, at least one of the power levels driving the first channel into compression;

measuring the first magnitude compression response and the first phase compression response of the first channel; and

determining a magnitude compensation and a phase compensation for the first channel as a function of the plurality of power levels of the input signal.

8. The method of Claim 7, wherein the input signal is applied to the second channel, the second channel being non-compressed by the plurality of power levels, and wherein the first phase compression response is measured relative to the non-compressed second channel.

9. The method of Claim 7, wherein after determining the compensations, the second channel is characterized comprising:

using the input signal to drive the first channel and the second channel into compression, the input signal having the plurality of power levels, at least one of the power levels further driving the second channel into compression;

measuring the magnitude compression response and the phase compression response of the second channel, the phase compression response of the second channel being measured relative to the first channel; and

determining a magnitude compensation and a phase compensation for the second channel as a function of the plurality of power levels using the determined magnitude compensation and the determined phase compensation of the first channel.

10. The method of Claim 7, wherein after determining the compensations, the second channel is characterized comprising:

using another input signal to drive the first channel and the second channel into compression, the input signal having another plurality of power levels, at least one of the power levels driving both channels into compression;

measuring the magnitude compression response of the first channel and the magnitude compression response and the phase compression response of the second channel, the phase compression response of the second channel being measured relative to the first channel; and

determining a magnitude compensation and a phase compensation for the second channel as a function of the other plurality of power levels using the determined magnitude and phase compensations of the first channel and the measured magnitude compression response of the first channel.

11. The method of Claim 4, wherein the second channel is characterized comprising:

using an input signal to drive the second channel into compression, the input signal having a plurality of power levels, at least one of the power levels driving the second channel into compression;

measuring the second magnitude compression response and the second phase compression response of the second channel; and

determining a magnitude compensation and a phase compensation for the second channel as a function of the plurality of power levels of the input signal.

12. The method of Claim 11, wherein the input signal is applied to the first channel, the first channel being non-compressed by the plurality of power levels, and wherein the phase compression response of the second channel is measured relative to the non-compressed first channel.

13. The method of Claim 7, wherein after determining the compensations, the second channel is characterized comprising:

using another input signal to drive the second channel into compression, the input signal having another plurality of power levels, at least one of the power levels driving the second channel into compression, the first channel being non-compressed;

measuring the second magnitude compression response and the second phase compression response of the second channel, the phase compression response of the second channel being measured relative to the first channel; and

determining a magnitude compensation and a phase compensation for the second channel as a function of the plurality of power levels of the input signal.

14. The method of Claim 4, wherein characterizing the first receiver channel and characterizing the second receiver channel each comprises:

driving the receiver channel into compression, such that the channel has non-linear behavior; and

determining a deviation from linear behavior of the compressed receiver channel.

15. The method of claim 14, wherein driving and determining are repeated at a plurality of different frequencies.

16. A method of extending dynamic range of a test system comprising:

characterizing a reference receiver channel of the test system for a reference magnitude compression response and a reference phase compression response;

characterizing a second receiver channel of the test system for a second magnitude compression response and a second phase compression response; and

compensating for an effect that compression of one or both of the reference channel and the second channel has on measured magnitude data and measured phase data.

17. The method of Claim 16, wherein the reference channel is characterized comprising:

applying an input signal to an input of the reference channel and to an input of the second channel, the input signal having a plurality of different power levels, wherein at least one of the power levels drives the reference channel into compression, while the second channel is non-compressed;

measuring the reference magnitude compression response and the reference phase compression response of the reference channel, the phase compression response being measured relative to the second channel; and

determining a magnitude compensation and a phase compensation for the reference channel as a function of the plurality of power levels of the input signal.

18. The method of Claim 16, wherein the second channel is characterized comprising:

applying another input signal to the input of the second channel and to the input of the reference channel, the other input signal having another plurality of power levels, wherein at least one of the power levels drives the second channel into compression;

measuring the second magnitude compression response and the second phase compression response of the second channel, the second phase compression response being measured relative to the reference channel; and

determining a magnitude compensation and a phase compensation for the second channel as a function of the other plurality of power levels of the other input signal.

19. The method of Claim 17, further comprising attenuating the input signal before the input signal is applied to the second channel to achieve the second channel non-compression.

20. The method of Claim 19, wherein the second channel is characterized after the reference channel is characterized, comprising:

further applying the input signal to the input of the reference channel, and further applying the input signal without attenuation to the input of the second channel, wherein at least one of the power levels drives both the second channel and the reference channel into compression;

measuring the magnitude compression response and the phase compression response of the second channel, the phase compression response of the second channel being measured relative to the reference channel; and

determining a magnitude compensation and a phase compensation for the second channel as a function of the plurality of power levels using the determined magnitude compensation and the determined phase compensation of the first channel.

21. The method of Claim 16, wherein compensating comprises using magnitude compensations and phase compensations determined for the reference channel and the second channel to correct the measured data.

22. The method of Claim 21, wherein the measured magnitude data and the measured phase data are measured for one of a device under test and a signal under test using the reference channel and the second channel of the test system.

23. The method of Claim 16, wherein characterizing the reference channel and characterizing the second channel are performed periodically, while compensating is performed for each data measurement of one of a device under test and a signal under test.

24. The method of Claim 16, wherein the test system comprises more channels than the reference channel and the second channel, and wherein characterizing is performed sequentially for different pairs of channels in the test system.

25. The method of Claim 16, wherein the test system comprises a single receiver channel, one of the reference channel and the second channel being an implicit channel.

26. The method of Claim 16, wherein characterizing the reference receiver channel, characterizing the second receiver channel, and compensating are performed sequentially at one or more frequencies.

27. A test system having extended dynamic range comprising:

a receiver channel;

a controller that processes magnitude data and phase data generated by the receiver channel; and

a computer program stored in memory, the computer program being executed by the controller, the computer program implementing instructions that compensate for an effect on the generated data caused by the receiver channel being compressed.

28. The test system of Claim 27, further comprising:

a power limiter connected to an input of the receiver channel, wherein the instructions implemented by the computer program further compensate for an effect on the generated data caused by the limiter being compressed.

29. The test system of Claim 27, wherein the test system is one of network analyzer and a spectrum analyzer.

30. The test system of Claim 27, further comprising:

another receiver channel; and

a signal source;

wherein the signal source generates a signal that is applied to the receiver channel, to an input of a device under test, and after passing through the device under test, to the other receiver channel, and wherein phase is measured as a phase difference between the receiver channels.

31. The test system of Claim 30, further comprising:

a power limiter connected to an input of the second receiver channel, wherein the instructions implemented by the computer program further compensate for an effect on the generated data caused by the limiter being compressed.

32. The test system of Claim 27, wherein the computer program further implements instructions that drive the receiver channel into compression, such that the channel has non-linear behavior; and that determine a deviation from linear behavior of the compressed receiver channel, the deviation being the effect on the generated data.

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